

Digital researchers and data experts

We create digital tools
to explore academic
research in new ways.



PRACTICAL METHODS in DIGITAL HERITAGE

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Neil Jakeman

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Why do we make digital 3D models ?

To provoke an emotional or intellectual response to an environment that no longer exists?

To allow close examination of 'indestructible' versions of delicate artefacts?

To compare items across dispersed collections?

To make analytical judgements about the topographical qualities of a landscape?

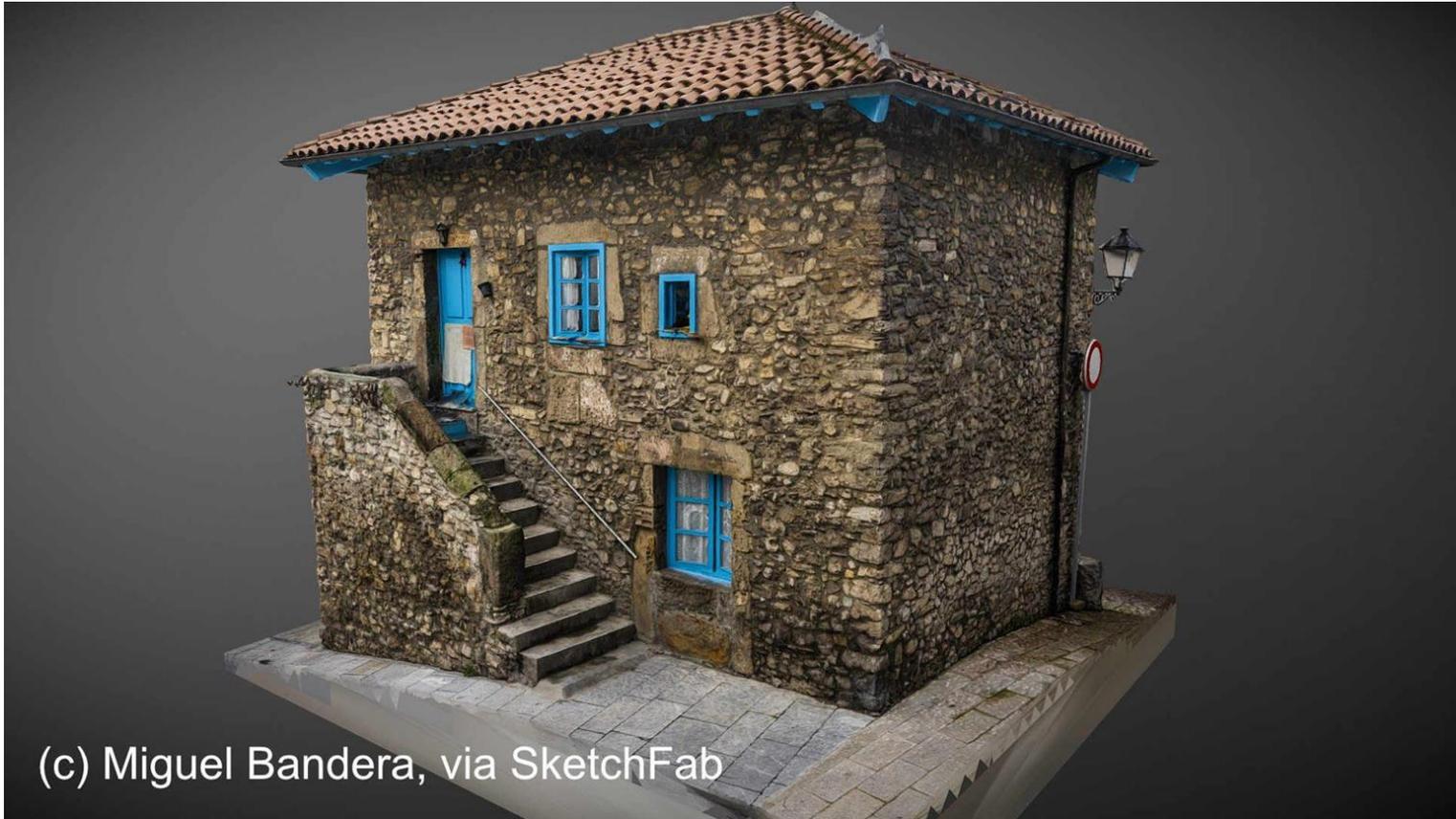
To ...

(A personal differentiation)

Acquisition - Direct scanning or sensing of a physical surface to approximate as closely as appropriate its original forms, textures and appearance.

Creation - Manual, interpretative creation of 3D objects using geometric primitives as building blocks to create an indicative representation of an object or environment

e.g. Photogrammetry is to 3D modelling, as Photography is to Painting



(c) Miguel Bandera, via SketchFab

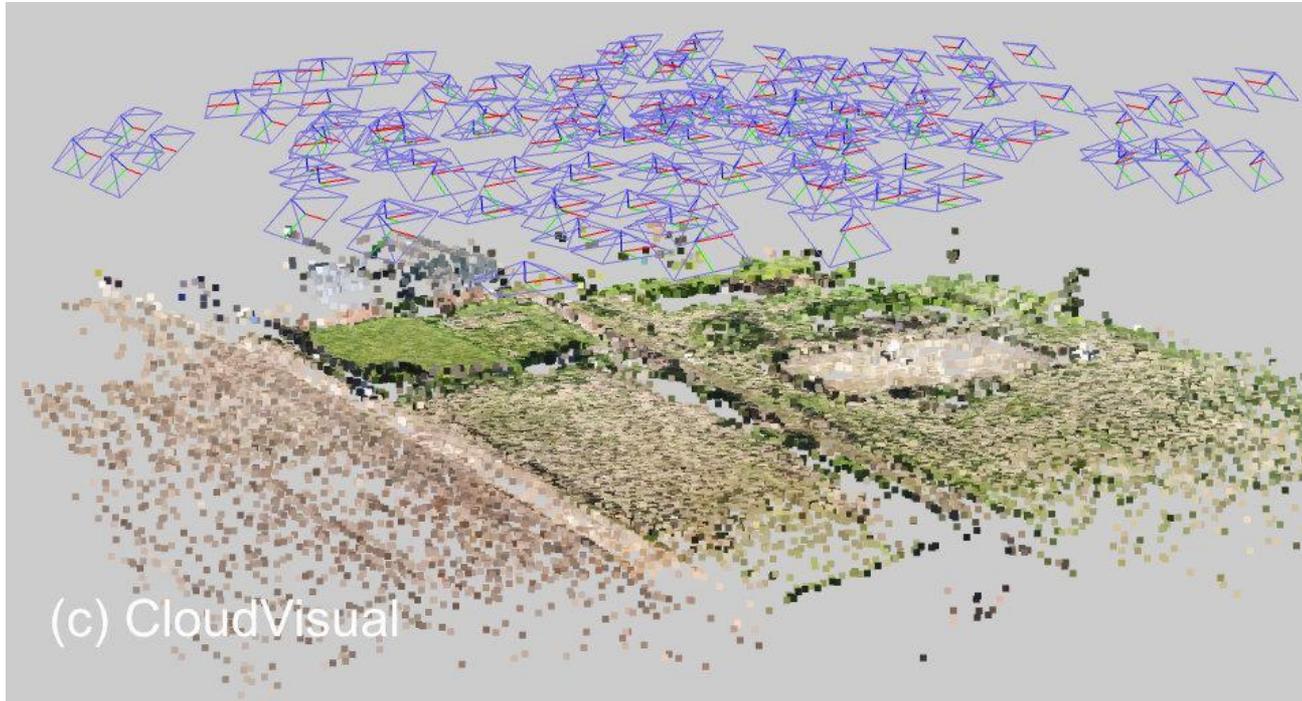


An entry point to digital 3D?

Wide application across different scales - landscapes, buildings, objects, but not necessarily applicable to very detailed small scale surfaces.

Technically accessible - can be performed with quite basic kit like a mobile phone or an array of DSLRs in controlled conditions

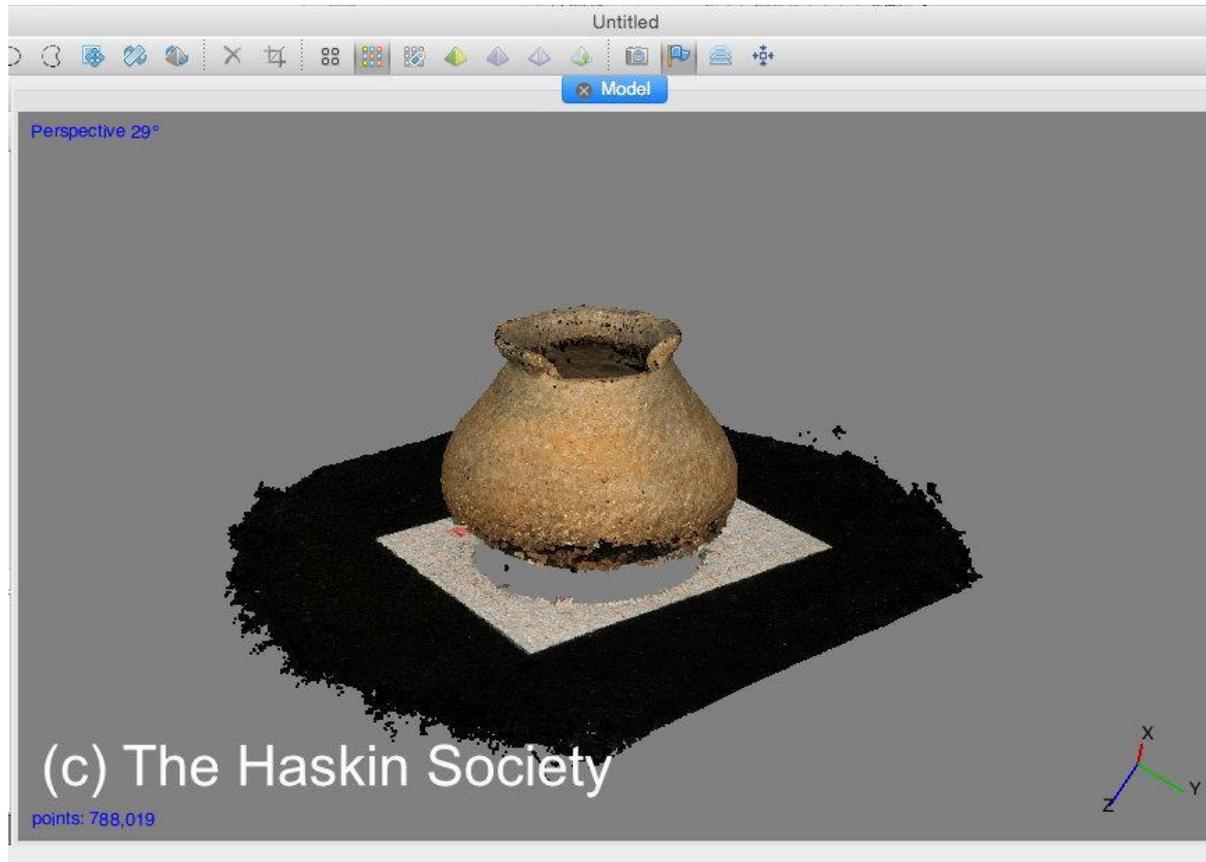
Simple to learn







(c) UMBC.edu



Photogrammetry Pipeline >

- **Natural Feature Extraction**
- **Image Matching**
- **Features Matching**
- **Structure from Motion**
- **Depth maps estimation**
- **Meshing**
- **Texturing**

[Alice Vision|Photogrammetry Pipeline](#)

Controlled, diffuse light, minimising variation in intensity across the subject

Clear scale references in the images so accurate measurements can be taken after capture

Using the same lens at the same focal length will help to compensate for distortion

Using a turntable to ensure regular increments of rotation to ensure good coverage and that the capture process is reproducible

RAW image files, preferably in DNG format to avoid any file compression artefacts and retain maximum dynamic range of tones

Agisoft Metashape - <https://www.agisoft.com/>

Reality Capture - <https://www.capturingreality.com/>

Meshroom tool (Alice Vision) - <https://alicevision.github.io/>







Reflective and transparent surfaces - Polarising lenses, Coating Sprays for a matt surface

Camera settings - ISO, Depth of Field

White balance - warm vs. cold

Baked shadows

Try technology in action with a low tech experiment

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